CA-IR-24

Ref: T-9, Page 3 and Exhibit HECO-901 Pages 10 and 11.

For each alternative, please provide a detailed breakdown of the:

a. Planning costs (previously spent and estimate of future expenditures). Also, break out the planning costs for the 138 kV planning and 46 kV planning when an alternative includes costs carried over from 138 kV project planning.

b. Permit and approval costs (previously spent and estimate of future expenditures). Break out 138 kV permit and approval costs and 46 kV permit approval costs when an alternative includes costs carried over from 138 kV project permitting and approval activities.

c. Material and labor costs (as presented in Tables 1, 2, 3 and 4 of HECO-901 for transmission, sub-transmission and distribution improvement costs). Please provide the estimate of units such as circuit miles, etc. used to develop the costs for each alternative.

HECO Response:

a. The information request makes a distinction between "138 kV planning" and "46 kV planning". As is indicated in response to CA-IR-36, the East Oahu Transmission Project ("EOTP") involves HECO's efforts to address the East Oahu transmission problems and concerns, including (1) the Koolau/Pukele Overload Situation, (2) the Downtown Overload Situation, (3) the Pukele Substation Reliability Concern, and (4) the Downtown Substation Reliability Concern. (See HECO T-1, pages 2-3.) HECO's efforts to address these problems and concerns were initiated in 1991, as is detailed in HECO T-2.

HECO also notes that the planning process that resulted in the selection of a 138 kV alternative to address the East Oahu transmission problems and concerns included the consideration of 46kV options (as well as non-transmission options). Similarly, the continuation of the planning process after the Waahila Ridge 138 kV alternative was eliminated as a viable option by the BLNR action, which resulted in the selection of a 46kV alternative to address the East Oahu transmission problems and concerns, included the

consideration of 138kV alternatives (as well as non-transmission options.)

The planning costs incurred through June 2002 are indicated in response to CA-IR-36. These costs were incurred for activities such as: (1) planning studies (pages 11-13), (2) an extensive public scoping and input process, involving a Community Advisory Committee ("CAC"), pursuant to which an extensive evaluation of transmission and non-transmission alternatives was undertaken (pages 15-17), (3) more than 150 project briefings for public agencies, neighborhood boards, elected officials and community organizations in the 1992-1998 time frame (page 18), (4) a Routing Study and EIS consultation, scoping and review process, which involved updating planning studies and the review of transmission and non-transmission alternatives, as well as an analysis of the Act 95 factors (pages 19-27), and (5) efforts to obtain the Conservation District Use Permit ("CDUP") for the partial overhead, partial underground 138kV alternative (pages 28-30).

A detailed breakdown of these costs has not been developed, but HECO is working on a further breakdown, and will provide the analysis when it is completed.

b. See response to subpart a.

c. See attached pages 3-8 for the workpapers.

TABLE 1 - MAJOR MATERIAL INCLUDED IN 138kV UG ESTIMATE (HPFF)

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku-Pukele Substation		
21010	feet	8" steel cable pipe	$265	$5,567,650
21010	feet	5" steel fluid pipe	$200	$4,202,000
22920	circuit feet	138kV cable	$250	$5,730,000
10	each	138kV manhole	$75,000	$750,000
10	each	138kV joint	$45,000	$450,000
6	each	138kV terminator	$23,500	$141,000
1	each	138kV pressurizing plant	$600,000	$600,000

TABLE 3 - MAJOR MATERIAL INCLUDED IN SUBSTATION ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku Substation		
1	each	138kV GIS breaker	$600,000	$600,000
2	each	Relay panel	$25,000	$50,000
1	each	Relay panel	$17,000	$17,000
		Pukele Substation		
2	each	138kV GIS breaker	$500,000	$1,000,000
5	each	Relay panel	$25,000	$125,000
1	each	Relay panel	$17,000	$85,000

TABLE 2 - MAJOR MATERIAL INCLUDED IN 138kV UG ESTIMATE (XLPE)

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku-Pukele Substation		
21010	circuit feet	138kV ductbank	$225	$4,727,250
22920	circuit feet	138kV cable	$210	$4,813,200
12	each	138kV manhole	$50,000	$600,000
60	each	138kV splice	$7,000	$420,000
12	each	138kV terminator	$12,000	$144,000

TABLE 3 - MAJOR MATERIAL INCLUDED IN SUBSTATION ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku Substation		
1	each	138kV GIS breaker	$600,000	$600,000
2	each	Relay panel	$25,000	$50,000
1	each	Relay panel	$17,000	$17,000
		Pukele Substation		
2	each	138kV GIS breaker	$500,000	$1,000,000
5	each	Relay panel	$25,000	$125,000
1	each	Relay panel	$17,000	$85,000

TABLE 4 - MAJOR MATERIAL INCLUDED IN 46kV UG ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Makaloa-McCully Sub		
3450	circuit foot	46kV duct bank	$272	$938,400
6900	circuit foot	46kV cable	$45	$310,500
9	each	46kV manhole	$66,000	$594,000
		Pumehana Street		
130	circuit foot	46kV duct bank	$150	$19,500
130	circuit foot	46kV cable	$45	$5,850
1	each	46kV manhole	$55,000	$55,000
		Date Street		
50	circuit foot	46kV duct bank	$272	$13,600
100	circuit foot	46kV cable	$45	$4,500
360	circuit foot	46kV duct bank	$177	$63,720
360	circuit foot	46kV cable	$45	$16,200
2	each	46kV manhole	$66,000	$132,000
		Winam Street		
420	circuit foot	46kV duct bank	$150	$63,000
420	circuit foot	46kV cable	$45	$18,900
2	each	46kV manhole	$66,000	$132,000

TABLE 5 - MAJOR MATERIAL INCLUDED IN SUBSTATION ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku Substation		
1	each	138-46kV 80 MVA transformer	$1,000,000	$1,000,000
1	each	138kV GIS breaker	$600,000	$600,000
4	each	Relay panels	$25,000	$100,000
3	each	Relay panels	$20,000	$60,000
		Various Distribution Substations		
4	each	46kV disconnect switch	$6,000	$24,000
8	each	46kV switch interrupter	$5,500	$44,000
1	each	46kV switch interrupter	$6,000	$6,000
25	each	Motor operator	$4,000	$100,000
6	each	48 VDC battery bank	$3,800	$22,800
6	each	Battery cabinet	$8,000	$48,000

TABLE 4 - MAJOR MATERIAL INCLUDED IN 46kV UG ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Makaloa-McCully Substation		
3450	circuit foot	46kV duct bank	$272	$938,400
6900	circuit foot	46kV cable	$45	$310,500
9	each	46kV manhole	$66,000	$594,000
		Pumehana Street		
130	circuit foot	46kV duct bank	$150	$19,500
130	circuit foot	46kV cable	$45	$5,850
1	each	46kV manhole	$55,000	$55,000
		Date Street		
50	circuit foot	46kV duct bank	$272	$13,600
100	circuit foot	46kV cable	$45	$4,500
360	circuit foot	46kV duct bank	$177	$63,720
360	circuit foot	46kV cable	$45	$16,200
2	each	46kV manhole	$66,000	$132,000
		Winam Street		
420	circuit foot	46kV duct bank	$150	$63,000
420	circuit foot	46kV cable	$45	$18,900
2	each	46kV manhole	$66,000	$132,000
		King Street		
8325	circuit foot	46kV duct bank	$380	$3,163,500
24975	circuit foot	46kV cable	$45	$1,123,875
1540	circuit foot	46kV duct bank	$177	$272,580
1540	circuit foot	46kV cable	$45	$69,300
20	each	46kV manhole	$66,000	$1,320,000

TABLE 5 - MAJOR MATERIAL INCLUDED IN SUBSTATION ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Kamoku Substation		
1	each	138-46kV 80 MVA transformer	$1,000,000	$1,000,000
1	each	138kV GIS breaker	$600,000	$600,000
4	each	Relay panels	$25,000	$100,000
3	each	Relay panels	$20,000	$60,000
		Archer Substation		
1	each	138-46kV 80 MVA transformer	$900,000	$900,000
1	each	138kV GIS breaker	$600,000	$600,000
3	each	Relay panels	$20,000	$60,000
1	each	Relay panel modification	$10,000	$10,000
		Various Distribution Substations		
4	each	46kV disconnect switch	$6,000	$24,000
8	each	46kV switch interrupter	$5,500	$44,000
1	each	46kV switch interrupter	$6,000	$6,000
25	each	Motor operator	$4,000	$100,000
6	each	48 VDC battery bank	$3,800	$22,800
6	each	Battery cabinet	$8,000	$48,000

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		Makaloa-McCully Substation		
3450	circuit foot	46kV duct bank	$272	$938,400
6900	circuit foot	46kV cable	$45	$310,500
9	each	46kV manhole	$66,000	$594,000
		Pumehana Street		
130	circuit foot	46kV duct bank	$150	$19,500
130	circuit foot	46kV cable	$45	$5,850
1	each	46kV manhole	$55,000	$55,000
		Date Street		
50	circuit foot	46kV duct bank	$272	$13,600
100	circuit foot	46kV cable	$45	$4,500
360	circuit foot	46kV duct bank	$177	$63,720
360	circuit foot	46kV cable	$45	$16,200
2	each	46kV manhole	$66,000	$132,000
		Winam Street		
420	circuit foot	46kV duct bank	$150	$63,000
420	circuit foot	46kV cable	$45	$18,900
2	each	46kV manhole	$66,000	$132,000
		King Street		
8325	circuit foot	46kV duct bank	$380	$3,163,500
24975	circuit foot	46kV cable	$45	$1,123,875
1540	circuit foot	46kV duct bank	$177	$272,580
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1	each	138kV GIS breaker	$600,000	$600,000
4	each	Relay panels	$25,000	$100,000
3	each	Relay panels	$20,000	$60,000
		Archer Substation		
1	each	138-46kV 80 MVA transformer	$900,000	$900,000
1	each	138kV GIS breaker	$600,000	$600,000
3	each	Relay panels	$20,000	$60,000
1	each	Relay panel modification	$10,000	$10,000
		Various Distribution Substations		
4	each	46kV disconnect switch	$6,000	$24,000
8	each	46kV switch interrupter	$5,500	$44,000
1	each	46kV switch interrupter	$6,000	$6,000
25	each	Motor operator	$4,000	$100,000
6	each	48 VDC battery bank	$3,800	$22,800
6	each	Battery cabinet	$8,000	$48,000

TABLE 4 - MAJOR MATERIAL INCLUDED IN 46kV UG ESTIMATE

Quantity	Unit	Description	Estimated Unit Cost	Total Cost
		Makaloa-McCully Substation		
1000	circuit foot	46kV duct bank	$226	$226,390
6900	circuit foot	46kV cable	$45	$310,500
0	each	46kV manhole	$66,000	$0
		Pumehana Street		
730	circuit foot	46kV duct bank	$217	$158,760
730	circuit foot	46kV cable	$45	$32,850
2	each	46kV manhole	$50,000	$100,000
		Date Street		
50	circuit foot	46kV duct bank	$272	$13,600
100	circuit foot	46kV cable	$45	$4,500
360	circuit foot	46kV duct bank	$177	$63,720
360	circuit foot	46kV cable	$45	$16,200
2	each	46kV manhole	$66,000	$132,000
		Winam Street		
420	circuit foot	46kV duct bank	$150	$63,000
420	circuit foot	46kV cable	$45	$18,900
2	each	46kV manhole	$66,000	$132,000
		King Street		
8325	circuit foot	46kV duct bank	$380	$3,163,500
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4	each	Relay panels	$25,000	$100,000
3	each	Relay panels	$20,000	$60,000
		Archer Substation		
1	each	138-46kV 80 MVA transformer	$900,000	$900,000
1	each	138kV GIS breaker	$600,000	$600,000
3	each	Relay panels	$20,000	$60,000
1	each	Relay panel modification	$10,000	$10,000
		Various Distribution Substations		
4	each	46kV disconnect switch	$6,000	$24,000
8	each	46kV switch interrupter	$5,500	$44,000
1	each	46kV switch interrupter	$6,000	$6,000
25	each	Motor operator	$4,000	$100,000
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